CLASSIFICATION S-E-C-R-E-T SECRET

CENTRAL INTELLIGENCE AGENCY

INFORMATION FROM
FOREIGN DOCUMENTS OR RADIO BROADCASTS

REPORT

CD NO.

50X1-HUM

COUNTRY USSR

SUBJECT Economic; Technological - Chemical industry, fuel substitutes, machinery

HOW PUBLISHED Daily and semiweekly newspapers

WHERE PUBLISHED Moscow

DATE PUBLISHED 17, 21 Apr 1951

LANGUAGE Russian

DATE OF INFORMATION 1951

DATE DIST. 24 Aug 1951

NO. OF PAGES 4

SUPPLEMENT TO REPORT NO.

THIS IS UNEVALUATED INFORMATION

SOURCE Newspapers as indicated.

SUN'S RAYS, THERMOPHILE MICROORGANISMS SUPPLY HEAT FOR INDUSTRIAL PURPOSES

BOILERS, DISTILLERS, AIR COOLERS OPERATE BY SOLAR RADIATION -- Moscow, Vechernyaya Moskva, 21 Apr 51

The Committee for Cooperating With the Large Construction Projects of Communism, attached to the Academy of Sciences USSR, has recommended the use of solar water heaters and other devices at the site of the great construction projects which are situated below the latitude of 50 degrees, that is, south of a line running through Kiev, Khar'kov, Stalingrad, and Aktyubinsk. Solar devices in this area will be of assistance to the builders of canals, dams, and hydroelectric stations.

Most people, after actually using them, will be satisfied with the value, convenience, and simplicity of apparatus which utilize the sun's energy for very different purposes. Solar water heaters, boilers, and kitchens can save an enormous quantity of firewood and coal.

The earth gets one two-billionth part of the energy radiated by the sun. A negligible part of the sun's energy, 230 billion horsepower, is distributed over the whole earth. The problem lies in concentrating this energy in a definite spot.

There are two basic methods of solving this problem, concentrating the solar energy by the use of mirrors, and building "traps" or "hot boxes" for the sun's rays, which gradually give off their own heat. Both methods have been tested and checked, and each has its own advantages.

As early as 1890, the Russian scientist V. K. Tserasskiy designed a mirror, in the focus of which a 3,500-degree temperature was reached. Metals of high heat resistance were melted.

SECRET

CLASSIFICATION S-E-C-R-E-T

STATE	X	NAVY	X	NSRB	DISTRIBUTION
ARMY	X	AIR	X	FBI	

50X1-HUM

The working principle of a hot box is very simple. A sheet of iron, painted black for best heat absorption, is put into a flat wooden box covered on the top with a plate of window glass. This is the "trap" for the sun's rays in its simplest form. The sun radiates light waves of different length. The shorter waves easily penetrate the glass and heat the iron sheet, which also radiates energy, but these waves are much longer, and the glass becomes an impenetrable obstacle to them. The better the box is protected from loss of heat through its walls, the higher the temperature which can be attained.

B. P. Veynberg, B. V. Petukhov, V. A. Baum, V. P. Kislov, B. K. Bodashkov, K. G. Trofimov, V. N. Bukhman, and other enthusiasts in heliotechnics, the science which deals with the utilization of the sun's energy, have not only devoted much effort to practical improvement of the hot boxes, but have also developed the theoretical side of the problem. Their work has made it possible to create solar apparatus which are particularly suited to given conditions, and to plan completely new installations.

Petukhov has designed a dependable and simple water heater of the tubular type, with automatic circulation of the water heated by the sun. This equipment has been of great service in the south. In Petukhov's hot box, the water pipes, which are connected at top and bottom to common headers, are under glass. From the upper header the heated water passes into a tank, where it is collected. Lengthy testing has shown that in the Ashkhabad region water can be heated by this method to 55-60 degrees. In Moscow in the summer, similar installations can heat water to a temperature of 52-53 degrees. A bath laundry, with a clothes dryer, is being planned for the canal builders in the south, which will operate "by the sun" 8 or 9 months in the year, serving a village of 5,000 inhabitants.

Solar driers are extremely useful and convenient for many purposes, such as drying tobacco, fruits, and ceramic articles, and killing silkworms in their cocoons. Solar dryers have other advantages besides saving fuel. The vitamin content of food products produced in hot boxes is higher, and there is no possibility of overheating. In all localities which will be turned into rich soil by the new canals, solar apparatus will insure speedy, inexpensive processing of colossal quantities of agricultural products.

The builders in the south need not only hot, but boiled water. The Heliotechnics Laboratory of the Power Engineering Institute of the Academy of Sciences USSR has already developed a unit which boils 4 liters of water an hour. It has a boiler and a mirror 1.2 meters in diameter. The boiler is a box on which the sun's rays are concentrated, reflected by the mirror. The box contains a kettle with water. For a public supply system, workers at the Heliotechnics Laboratory have planned a large solar boiler which will supply 300 liters of boiling water a day.

In some areas only salt water can be obtained. The sun is of assistance here too. When the salt water is brought to a boil in a solar boiler, it can be easily distilled and rendered suitable for drinking. An experimental distiller for 40-50 liters a day has been designed by Soviet heliotechnicians for testing under different conditions at new construction sites.

As early as 1937, B. V. Petukhov, B. K. Bodashkov, and L. M. Rozenfel'd created the first cooling unit in the world in which the sun has served as the source of cold. In this unit, heat, accumulated in a hot box, serves to evolve ammonia gases from an aqueous solution of ammonia. These gases are converted to liquid, and then revaporized, producing a temperature of -3 degrees or lower at noon in Central Asia. The unit operated successfully for several seasons. Its action is automatic, without consumption of fuel or other materials. The solar cooler can cool a room which would otherwise be unbearable. Cooling units are absolutely necessary in the south in surgical divisions of hospitals, sanatariums, and in buildings where many people gather.

50X1-HUM

The possibility of heating all cities and villages by a central heating system operating on solar heat is very interesting. In the south no great difference in inside and outside temperature is required as a rule. Accumulators of solar heat, in the form of large reservoirs of water heated on sunny days, would provide an uninterrupted supply of solar water heat for blocks, city rayons, and entire cities

The sun's rays have long been used in medicine in the form of sun baths. However, more intensive heating of separate parts of the body by means of special reflecting devices is being used only by certain enthusiasts of heliotechnics. Among them is V. N Bukhman, of Alma-Ata, one of the oldest Soviet heliotechnicians A great sensation has been created by his glass cage in which the nude patient goes through various procedures under the supervision of the doctor, who is dressed in his winter overcoat because of the fierce weather outside The "concentrated" rays of the sun, as has been demonstrated by the experience of the southern physiotherapeutic institutes, have a better effect than any artificial sources of light upon lupus vulgaris; hard-to-cure forms of eczema, and certain diseases of the joints, nose, and ear; and can be a great factor in the Soviet health system

The Heliotechnics Committee, headed by the eminent thermotechnician M. V. Kirpichev, and the heliotechnics laboratories have a wide field of activity. Soviet heliotechnics in practice will prove that solar apparatus can assist the transformation of nature at the construction sites, and the experience acquired there will permit heliotechnics to progress further. -- A. Morozov

THERMOPHILE MICROORGANISMS EXTRACT CAOUTCHOUC FROM KOK-SAGYZ -- Moscow, Pionerskaya Pravda, 17 Apr 51

E. N. Mishustin, Doctor of Biological Sciences and Stalin Prize winner, and a number of other Soviet researchers, have studied a large group of the so-called thermophile, or heat-loving, microbes. Their work is described below.

Ordinary microbes, imbedded in a nourishing substance, require 3 or 4 days to grow into a colony, that is, into a speck visible to the naked eye. Thermophile microbes, at the required temperature, form a large colony in a few hours.

Mishustin has explained the cause of the self-heating and self-igniting qualities of many substances. Microbes which get into loosely stacked hay, cotton, or tobacco multiply profusely. In breathing, the organism generates heat. Ordinary microbes, which cannot withstand the increase in temperature, die, but the thermophiles multiply with great speed. The temperature reaches 90 degrees, and the surface of the dry grass in the stack gradually becomes charred. The hot gases formed by the microbes, collecting on the charred surfaces, unite with the oxygen in the air and burst into flame.

Mishustin and the other researchers have worked out very simple measures for preventing the heating and igniting. For example, the hay, peat, or silo should be tightly packed. The smaller the amount of air which penetrates inside, the weaker the microbes will be. Fumigation with poisonous gases is also being used to weaken the microbes.

However, the microbes do not always cause damage. They are being compelled to work for the good of man. In large cities, rubbish is usually removed to dumping grounds, which occupy considerable space. The waste decays with the years, polluting the air. Mishustin and his colleagues suggested equipping large chambers for collecting rubbish. The thermophiles in the rubbish, decomposing the waste, begin to multiply profusely. Heat is generated, and the temperature in the chamber gradually increased to 80 degrees. When the chamber is opened, in a few days, instead of manure, soiled rags, paper, and rubbish, there is a

completely rotted, homogeneous mass, which is a fine fertilizer. The speed with which the thermophiles accomplish this work is astonishing. Within a week, only the skeleton remained from the corpses of a horse which had been thrown into the chamber. Under ordinary circumstances, this would require years.

In the manufacturing process, certain fabrics are impregnated with starch. However, it is difficult to remove the starch from the finished material. It must be soaked for a long time in a special costly solution. Thermophiles can break down the starch and remove it from the fabric in 5 or 6 minutes.

Thermophiles have shown themselves very helpful for the extraction of caoutchouc from the roots of the kok-sagyz. In the process formerly used, which required a great deal of labor, significant quantities of caoutchouc remained in the tissues and were lost. Now the roots of the kok-sagyz are mixed with manure and heaped up in piles. The microbes break down the root cells and release the caoutchouc from them.

The achievements of the Soviet scientists along these lines are described in Mishustin's work Thermophile Microorganisms in Nature and Practice, which was recently awarded a Stalin prize.

- E N D -